**IT Applications, Unit 4**

**Ch 6: Developing a solution using spreadsheet software, p 192-213**

**Case Study: Point Pleasant Social Service Program – organisational outline and current practice**

**Designing spreadsheet solutions and output**

1. **Describe what is involved in the solution design stage.**

The design stage involves planning the spreadsheet structure, any relationships between entities, the appearance of the information, creating the test plan and devising the evaluation criteria.

**Spreadsheet Design Tools**

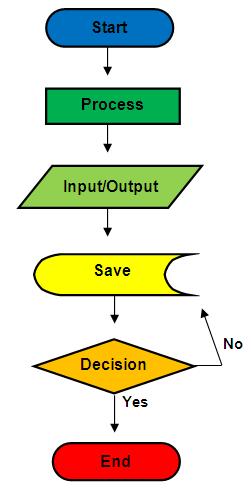
**Elaborate under each of the following design tools:**

1. **IPO chart**

An IPO chart is used in the design stage to clearly define the solution’s input, outputs and the processes that are required to transform the data into information. The IPO chart gives the designer an idea of how much formula development work might occur during the manipulation stage.

1. **Flow chart, (list what each of the symbols mean from fig. 5-10.**

A flow chart is used to graphically represent, in a logical order, the steps required to create a solution or procedure to use in the solution.



1. **Formula list**

A formula list is similar to a data dictionary and shows a detailed list of the formulas to be used to achieve each bit of output identified in the IPO chart.

1. **Structure chart**

A structure chart is a graphical representation of how the spreadsheet solution might work. The structure chart shows how each worksheet in a workbook relate to each other.

1. **Layout diagrams**

A layout diagram shows the basic layout of each type of worksheet in the spreadsheet solution. The layout diagram should indicate:

* The type of data to be entered into the cells
* Indication of the contents of each cell
* Labels
* Any validation rules, with the error messages to be displayed
* Formats and conventions to be followed
* Headings, sub-headings and instructions

**Formats and conventions, p 202-**

1. **Explain the difference between formats and conventions.**

A convention is a formal and accepted way of displaying information, like the layout of a letter. A format is a customised change to the appearance of a convention; for example, the use of different fonts and sizes in letter from different organisations.

1. **List under each of the following subheadings the major formats and conventions that apply to spreadsheets:**
   1. **Numerical information**

* Numbers are naturally rights aligned
* Money values have two decimal places or none
* Align decimal points by using a consistent number of decimal places
* Percentages in columns appear with the percentage symbol (%) at the top of the column rather than in with the data
* Sub-totals have a single line above the total
* Grand totals have a single or double line below the total
* Grand totals are in bold
* Symbols indicating the unit of measure, such as %, $, kg, cm, usually appear in the column heading rather than next to each value
* Used named ranges of cells to make formulas easier to understand.
  1. **Financial reports**
* Use a spaceor a comma to separate numbers greater than 999; for example 1,999
* Use italics to indicate addition or subtraction
* Sub-totals have a single line above the totals
* Include a $ sign in column headings rather than next to each money value
* Right align dates to allow for double figures 
  1. **Charts and graphs**
* Charts and graphs must have titles identifying the name of the organisation and the purpose of the graph or chart.
* The x-axis and the y-axis must be labelled
* Use a key if more than one set of data is displayed on a graph or chart
* Include author identification, and source of data and date and file name
* Include a unit of measurement
* Label each segment of the pie chart (starting at 12 o’clock position) from largest to smallest
* Include absolute figures and percentages
* Choose colours that match the information being displayed
* Use bar charts to show he differences between values or changes over time
* Use a pie chart to compare parts of a whole or the relationship between segments
* Use graphs to show trends or relationships between values on each axis
* Vary the type of lines or the thickness or colour when more than one is displayed on a line chart
* Limit the number of items represented in a chart to 5 or 6.
* Suitable centre a chart or graph in the middle of the page (horizontally)
* Briefly explain the purpose of the spreadsheet and define the author
* Where cells require user input, clearly define the cell.
* For group input cells, frame them or use a suitable colour to distinguish them
* Where cells display results, clearly indicate the cell (and the unit of measurement)
* For group output cells, frame them or use a suitable colour to distinguish them that is different to the input cell colour.
* Grouped or framed cells that will be printed with cells not for print out located outside
* List all equations used in a separate document
* Include an appropriate footer identifying the filename, date and page number.

1. **Describe the file naming conventions for spreadsheets.**

The filename of a spreadsheet ought to indicate its purpose and any time period it covers. Each worksheet m,ust also be given a short but meaningful name.

**Designing a macro**

1. **What is a macro?**

A macro completes an automated series of tasks. In spreadsheet programs, such as Excel, you create macros by using a macro recorder. Macros are used for tasks that will be preformed frequently.

**Validation**

1. **Describe each of the following types of validation used in a spreadsheet:**
   1. **Range checking**

Range checking involves checking to ensure that data falls within a certain range. For instance, the year level in most high school is 7 - 12. This can be validated by using a simple IF statement with upper and lower level boundaries. For example, IF(yr\_level>=7 and yr\_level<=12, (Year level data is not valid) displays an error message if the inappropriate number is entered.

* 1. **Existence checking**

If your spreadsheet is dealing with product codes, a lookup formula can be used to check the existence of a code in another worksheet table. It ensures that formulas will always display correct calculations

* 1. **Conditional formatting**

Excel allows for conditional formatting, so that you can usually alert the user that there is an error

* 1. **Data type checking**

Data type checking can be used if the data needs to be of a particular type. For example, check to make sure that the numbers of balls sold are integers and not decimal numbers, or that a valid date is entered. The alignment of data in a column also provides a means of checking for correct data type.

* 1. **Restricted data entry**

The best way to ensure that data is valid is to restrict data entry. For example, a drop down menu.

* 1. **Validation alerts**

Electronic validation methods need to alert the user that the data being entered does no adhere to the validation rules. For example, pop up dialogue boxes.

**Planning to test a spreadsheet solution**

1. **What is the difference between validation and testing?**

Validation is involved with input while testing is concerned with the solution itself and the output.

1. **When is the test plan or test table created?**

The test plan is created after the designs for the actual solution have been created.

1. **Attributes or properties to a spreadsheet solution that need to be tested; elaborate under each of the following testing types:**
   1. **Functionality testing**

The functionality of a system relates to the activities or tasks that it is designed to carry out. When testing functionality, it is important to look at the original problem and determine if the solution meets the organisations needs. You should always test all the formulas in a systematic way.

* 1. **Presentation testing**

During the design stage s decision must be made about the presentation of the solution and the most appropriate format must be chosen, e.g. chart, graph or list of results. When testing the presentation it is important to look at the colours used, the fonts, headings, titles, the balance of text and images on a page, use of consistent formats and conventions and also how easy the solution is to read.

* 1. **Usability testing**

The information conveyed should be easily accessible to the users. When testing the usability it is important to note whether or not you need to scroll a long way to see the information, the worksheets are clearly labelled, it is easy to go back to the previous pages, all the hyper links work and can the user accidentally delete formulas.

* 1. **Accessibility testing**

The spreadsheet should be easily accessible and you should consider testing the following;

* Does the solution open up to the right worksheet?
* Are the font sizes easy to read?
* Is there limited use of red and green colours on the spreadsheet for people who are colour blind?
  1. **Communication of message**

The information in the solution needs to be clear and precise. The reader should nor get lost in all the less vital information because this hinders their ability to clearly understand the message being communicated.

**Evaluating the solution and output**

1. **What does evaluation consider?**

Evaluation considers the efficiency and effectiveness of the solution. it usually takes place after the solution is implemented, often between 3-6 months.

1. **What information needs to be gathered?**

Information from a variety of users needs to be gathered.

1. **Who is best to undertake the evaluation?**

The evaluation is usually best undertaken by someone other than the developer, so that the solution is more likely to be viewed impartially

1. **When are the evaluation criteria developed?**

The evaluation criteria are developed in the design stage of the problem solving methodology so that the system designers know what features to include.